a.) Amendments to Specification

Please replace the paragraph, beginning at page3 , paragraph [0022], in the specification as published, with the following written paragraph:

-- [0022] Provided in FIG. 1 is an illustrative portion 10 of a seamless substrate of the present invention with enlarged views of diffraction gratings in several pixels (11-18) ablated by interfering laser beams. In particular, shown in FIG. 1 are diffraction gratings of different pitches (a grating pitch can be defined as a distance between the adjacent crests or grooves), and different orientations of the grooves or crests relative to some direction. Each diffraction grating in each pixel is created by interfering two laser beams 19 and 20 on the surface of the seamless substrate, as shown in FIG. 2 with regard to pixel 11. The interfering laser beams 19 and 20 form an interference pattern characterized by a number of periodic maxima and minima in the laser intensity with a period (pitch) d. Period d is defined by the diffraction equation as d=.lambda./2 sin.theta.. The intensity maxima have sufficient energy to ablate the material of a substrate 60 at pixel 11 and form a diffraction grating 25 in pixel 11 with a pitch d, as shown in FIG. 3. For the best results in the ablation process, substrate 60 is preferably coated with an outer layer made of a material particularly suitable for being ablated by a laser. In particular, the outer layer can be a polymer layer, such as an epoxy molding resin, acrylated epoxies, acrylated acrylics, polyamides, polyimides, polysulfones, PET (polyethylene terephthalate), PMMA (polymethyl metacrylate), PTFE (polytetra fluoroethylene), or polycarbonate. As seen in FIG. 3, white light 21 comprising light of different wavelengths is incident on diffraction grating 25. In accordance with the diffraction equation the light of a longer wavelength diffracts off the diffraction grating at larger angles (red light 24 in FIG. 3), while the light of a shorter wavelength diffracts at a smaller angles (violet light 22 in FIG. 3 and light 23 of intermediate wavelength in FIG. 3). Depending on an angle at which an observer looks at pixel 11, the observer will see light of a particular color. An optical system for ablating a seamless substrate in a pixel-by-pixel fashion has been described in U.S. Pat. No. 6,388,780 assigned to Illinois Tool Works, the assignee of the present invention, which patent is incorporated herein by reference in its entirety. In particular, shown in

FIG. 4 is an embodiment of the optical system comprising collimating lenses 35 and 39, prisms 36 and 40, and condensing lens system 42, which are provided to direct laser beams 54 and 55 onto substrate 44 of cylinder 63 and interfere the beams on pixel 43. Galvoscanners 17 and 18 deflect each one of the two beams. A set of dotted semicircles depicts a variety of loci, or positions, along optical paths of the two beams as they are deflected by galvoscanners 17 and 18. More specifically, by applying appropriate electronic control signals to X, Y galvanometer 17, beam 34 can be deflected so that it passes through collimating lens 35 at any desired point on locus 45. Beam 38, on the other hand, can be correspondingly deflected so that it passes through collimating lens 39 at any desired point on locus 46. Because of the complementary relationship between the two X, Y galvanometers, these points on loci 45 and 46 will be at mirror image locations, provided only that the electronic deflection control signals applied to both galvanometers are the same. Each so-deflected beam then continues toward the nearest prism (prism 36 for one continuing beam half and prism 40 for the other). These continuing beams are designated in FIG. ~~3~~ <u>4</u> by reference numerals 50 and 51, respectively.--

Please replace the paragraph, beginning at page3 , paragraph [0023], in the specification as published, with the following written paragraph:

-- [0023] Due to the collimating nature of lenses 35 and 39, those continuing beams 50 and 51 maintain the same mirror image relationships as they had when passing through the collimating lenses 35, 39. Each of the two prisms 36 and 40 functions to redirect the respective beams 50, 51. The resulting beams exiting these prisms are designated in FIG. ~~3~~ <u>4</u> by reference numerals 37 and 41, respectively.--

Please replace the paragraph, beginning at page 3, paragraph [0028], in the specification as published, with the following written paragraph:

-- [0028] It is believed to be apparent that the locations on loci 47 and 48 at which beams 37, 41 arrive at the condensing lens system 42 can be changed at will by the simple expedient of appropriately adjusting the electronic control signals applied to X, Y galvanometers 17, 18. In

turn, such changes will change the azimuthal directions from which beams 54 and 55 reach pixel location 43 on surface 44 of cylinder 63, as shown in FIG. ~~3~~ 4, and therefore also the maximum holographic direction of that pixel.--

Please replace the paragraph, beginning at page 4, paragraph [0032], in the specification as published, with the following written paragraph:

-- [0032] It is important to note that while a very specific embodiment of the optical system for practicing the method of the present invention is described with regard to FIG. 4, a variety of optical systems of different design can be employed to produce pixel-by-pixel formation of diffraction gratings on surface 44 by ablating surface 44 with at least two interfering laser beams. For example, if a laser beam is generated by a laser source, then any system and method outputting two beams interfering at pixel location 43 on surface 44 will provide the necessary two interfering beams to ablate the surface and form a diffraction grating in that pixel. A diffraction grating can be used to produce a number of diffracted beams from an original laser beam in accordance with the diffraction equation $d=m\lambda/\sin\theta$ ~~d-m.lambda./sin.theta.~~, wherein m is an integer corresponding to a diffraction order. At least two diffracted beams can be used to interfere on surface 44 and ablate a diffraction grating in the desired pixel. A fiber optical system can be used to couple one of more laser beams into the optical fibers and propagate at least two beams through the optical system to interfere on surface 44.--